are likely to be very useful is in giving practical illustrations of Lie's methods. Lie's colossal work on transformation-groups is so very abstract and, at the same time, so exhaustive that it must, we fear, repel the great majority of readers; still it is hardly rash to predict that his ideas, as time goes on and they become more familiar, will prove to be of extreme value and fertility, and profoundly affect, not only the theory of differential equations, but almost every branch of analysis. It should be added that M. Goursat points out that Ampère employed contact transformations of a general character more than seventy years ago; and it is, in fact, one of the author's objects to recall attention to Ampère's remarkable memoirs in cahh. 17, 18 of the *Journal de l'École Polytechnique.* G. B. M.

OUR BOOK SHELF.

Our Weights and Measures: a Practical Treatise on the Standard Weights and Measures in use in the British Empire, with some Account of the Metric System. By H. J. Chaney. Pp. viii + 164. (London: Eyre and Spottiswoode, 1897.)

THE Superintendent of Weights and Measures gives in this book an authoritative account of the present practice in regard to the various weights and measures used in trade or for the purposes of manufacture. The origin and history of ancient systems are briefly traced so far as to show how our present system comes to be what it is, and references are carefully given to other treatises and to Acts of Parliament on all points of importance.

The book is well illustrated. Some of the views are of antiquarian interest: *e.g.* the beautiful pictures showing the interior of the Pyx Chapel at Westminster Abbey, a depository for standards since the Norman period; but most of the illustrations have reference to weights and measures in actual use, and to the arrangements for their inspection and verification. Local inspectors of weights and measures will no doubt look on this book as a very useful and, indeed, indispensable compendium.

Teachers and writers of books on arithmetic would do well to take to heart the remarks on pp. 112–114. Thus not only is a list given of those weights and measures which alone need be taught to the exclusion of various customary and local designations which, from a national point of view, are now obsolete, but it is well pointed out that a few hours' actual weighing and measuring would make the children in schools more at home with standard weights and measures than many hours of bare learning of the tables.

The last section of the work is on weights and measures used for special purposes; it includes, for instance, an account of engineers' gauges and standards, and gives tables of particulars of the Birmingham wire gauge, Whitworth's and Seller's screw threads, the B.A. small screw gauge, and several other standard gauges.

Practicum der Wissenschaftlichen Photographie. By Dr. Carl Kaiserling. Pp. xii + 404. (Berlin: Gustav Schmidt, 1898.)

IN this volume of about 400 pages we have a work which will be read by most photographers, whether amateur or professional, who are familiar with the German language, for, besides covering a great deal of ground, the subject is treated of in much detail. Although portraiture and landscape photography are included in the text, the author presents the subject more especially for those who employ photography as a means of aiding them in their scientific investigations. Thus, for instance, the medical man is enlightened as to the best means of illuminating portions of the human body to get the best effects from his point of view, and to photograph with success anatomical sections for demonstrations or collections. Microphotography is also treated at some length, and is well illustrated by some fine autotypes.

It must not be assumed that the optics and manipulations are here somewhat ignored at the expense of the new lines on which the book has been written. Both of these come in for their full share, and are well discussed and described, besides being copiously illustrated. Most of the new lenses are referred to at some length, and are accompanied by numerous tables for determining the lengths of exposures under different conditions. Methods of obtaining positives and enlargements, stereoscopic photography, Röntgen photography, and photography in natural colours, besides processes for reproduction, are all in their turn dealt with individually; and the reader who wishes to specialise in any one or more of these branches will find ample information in these chapters.

Enough, perhaps, has been written to show that this book is not only a useful *vade-mecum* for the student of science who wishes to obtain the best results in his special line of work, but is a valuable addition to our photographic literature. The illustrations are numerous, and there is, what is often absent from a great many German books, a good index.

Principles of Mechanism: a Treatise on the Modification of Motion by means of the Elementary Combinations of Mechanism, or the Parts of Machines, for use in College Classes, by Mechanical Engineers, &c. By S. W. Robinson, C.E., D.Sc., till recently Professor of Mechanical Engineering in the Ohio State University. Pp. xv + 309. (New York: John Wiley and Sons. London: Chapman and Hall, Ltd., 1896.)

THE main value of this work may not unfairly be said to consist in its 350 illustrations of elementary combinations of mechanism (in many cases more curious than useful), and in the descriptions appended thereto. In regard to the scope of the book, and, it may be added, the degree of clumsiness of expression of which the author is capable, we may quote the second sentence of the introduction: "In Principles of Mechanism we find the application to machines, of the principles of kinematics, or cinematics, the elementary combinations of mechanism of which machines, being studied separately."

A good many rules, useful in the drawing office, are exemplified; but the fundamental principles on which they are based are for the most part left unnoticed. Thus in Fig. 297 we have a complicated drawing of the fixed and moving centrodes of certain mechanisms, but we search the book in vain for any demonstration of the method of instantaneous centres on which the construction depends.

In Fig. 301 the curves of velocity-ratio of crank and connecting-rod are shown: the accompanying description identifies them with the fixed and moving centrodes of the motion. There is no appeal to the fundamental principles involved. In fact the book before us, however suitable for reference by an inventor, seems to us quite unfit for a student's text-book.

Introduzione allo Studio dei Silicati. By Dr. E. Ricci. (Milan: Ulrico Hoepli, 1898.)

IN this pamphlet the author seeks to classify the complex group of the mineral silicates, and he claims for his arrangement the merit of simplicity. The distinction between the hydrous and anhydrous silicates is abandoned, and all mineral silicates are grouped in the two primary divisions of orthosilicates and metasilicates. As simple orthosilicates he includes zircon, phenacite, and willemite with the Peridot family (olivine, sepiolite and calamine); and with the double orthosilicates he

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groups the felspars, the felspathoids, the micas, the garnets, the epidotes, the tourmalines, the zeolites, and the chlorites. Among the metasilicates we find the pyroxenes and amphiboles, with serpentine beryl and the copper silicates. The table of classification given at the end of the work includes most of the common rock-forming minerals, but does not deal with the rarer species. The author finds himself unable to accept Prof. E. Dana's nomenclature of the silicates, and, as will be seen from the foregoing summary, uses the terms orthosilicates and metasilicates for groups having very different limits to those assigned to them by the American mineralogist.

The Blood; how to examine and diagnose its Diseases. By Alfred C. Coles, M.D. Pp. xi + 260. Plates vi. (London: J. and A. Churchill, 1898.)

THE book before us is practically confined to the consideration of morphological methods. The author has endeavoured to collect what is known concerning the morphological changes as determined by staining reagents in the cellular elements of the blood in different diseases. He has further included a description of the methods requisite for the identification of certain parasites, and Widal's method of serum diagnosis in typhoid fever. The information contained in the book is, so far as concerns method, accurate; and those who prefer to have the methods for the examination of the blood in one volume, not under the head of the respective disease, as is done in the larger text-books of medicine, will no doubt find Dr. Coles' work useful. Some of the author's explanations and definitions are, however, not as exact as they should be; for instance, his remarks on chemiotaxis on p. 86, especially on negative chemiotaxis, are certainly original. The terms are not ordinarily used in the sense of the author. More might also have been done in the direction of a fuller bibliography.

F. W. T.

Notes on Volumetric Analysis. By Arthur Thornton, M.A., and Marchant Pearson, B.A. Pp. viii + 80. (London: Longmans, Green, and Co, 1898.)

THE series of twenty-seven experiments described in this book will serve as an elementary course of practical work in volumetric analysis, as they illustrate all the simple processes of neutralisation, oxidation, iodometry, and methods of precipitation. The instructions are clear; and the student who follows them should have no difficulty in performing the experiments, or in carrying out other exercises of the same type, while at the same time he should become skilful in general volumetric work.

A First Year's Course of Practical Physics, adapted for Beginners and Junior Students. By J. F. Tristram, M.A., B.Sc. Pp. 50. (London: Rivingtons, 1898.)

A SERIES of very elementary exercises on measurements of length, area, volume and density are given in this little book. Neither the plan of the book, nor the experiments described, present any novelties; but this will not prevent the volume from being of use in instructing young pupils in the methods of weighing and measuring.

The Doctrine of Energy: a Theory of Reality. By B. L. L. Pp. ix + 108. (London: Kegan Paul, Trench, Trübner, and Co., Ltd., 1898.)

THE argument that the conception of energy embraces and supersedes the conception of matter; that, in fact, the universe is not made up of two real things—matter and energy—but only one, was supported by the author from the standpoint of physical science in a volume published eleven years ago. The question is now presented as viewed from a metaphysical standpoint, and it will doubtless prove as interesting to students of philosophy as it is to students of physics.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Solfatara Gases.

WE have for a considerable time been occupied with an extensive study of the gases emanating from the earth in various parts of Italy with the object of detecting the presence of argon and helium, and possibly of other elements they may contain.

The first part of this work has already been published (*Gas delle terme di Abano, Gazzetta Chimica Italiana*).

We are now completing the study of the gases of the Solfatara di Pozzuoli, Grotta del Cane, Grotta ammoniacale, and of Vesuvius. In the spectrum of those of the Solfatara di Pozzuoli, which contain argon, we have found a sufficiently bright line with the wave-length 531·5, corresponding to that of corona 1474 K, attributed to coronium, an element not yet discovered, and which should be lighter than hydrogen. This line has never before been observed in earthy products. Besides we have noted the following lines:—653·5, 595·5, 536·2. In the spectrum of the gases gathered from the Fumarole of Vesuvius we have observed the lines:—769·5, 631·8, 572·5, 636·5, 441·5, and again 595·5. All these lines do not belong to the spectrum of argon or helium; they show a coincidence or proximity only with some unimportant lines of various elements, such as iron, potassium, titanium. Considering the conditions of our experiments, the presence of these elements in the gases we have studied is not probable. The line 572·5 is near to one of nitrogen, but being the only visible line of the spectrum of this gas, it cannot be attributed to it. Besides coronium we have thus probably other new elements in these gases.

We are diligently pursuing their investigation.

Padua.

R. NASINI,
F. ANDERLINI,
R. SALVADORI.

The Spectrum of Metargon.

THE letter which Messrs. Ramsay, Travers and Baly have addressed you on this subject calls for one or two remarks. The similarity between the carbon and metargon spectra does not only apply to the green band, but to the whole of the visible spectrum, and also, as my previous letter pointed out, to the ultra-violet band commonly ascribed to cyanogen. With the ordinary coil discharge I could see nothing but carbon bands, and it is contrary to all experience that two dissimilar bodies should give complicated spectra so much alike that a two-prism spectroscope can detect no difference between them. With the Leyden jar a strong continuous spectrum appeared, and, overlapping it, some of the lines of argon. The blue argon lines were absent, but my examination was not sufficiently detailed to allow me to say, that the visible lines were those commonly found in the "red spectrum." Neither with nor without the jar did I see any line which could not be assigned either to carbon or to argon, but I should have liked to try a stronger jar and a more powerful coil. With the jar there seemed to me to be signs of decomposition of the gas, as, on removing it again, the carbon lines were weak at first and only gradually returned. The pressure in the tube was rather high; and if the tubes experimented upon by Prof. Ramsay and his coadjutors were all at the same pressure, I should not attach much weight to their observation that the carbon oxide spectrum did not make its appearance after introduction of oxygen, for that spectrum only shows well at lower pressures.

I ask for nothing more than a "suspension of judgment" until a more detailed spectroscopic examination has been made. Only such an examination should include observations at atmospheric pressures, and also at lower pressures than those used so far.

It is also highly desirable to try Leyden jar sparks of much greater intensity than those I saw used at University College. I agree with Prof. Ramsay in so far that the brilliancy and whole appearance of the carbon spectrum does not suggest its being due to an impurity. Taking the spectroscopic evidence by itself, it points in the direction that the gas under examination is a compound of carbon either with argon or with a so far unknown body, and that it may be mixed with a considerable quantity of

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